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10/627,962	07/28/2003	Olli Piirainen	59643.00281	2270

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EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,962	PIIRAINEN ET AL.	
	Examiner	Art Unit	
	SIU M. LEE	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 21-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 21-24 direct to a computer program embodied on a computer-readable medium, wherein the computer program controlling a processor to perform a method". There is no support in the specification for a computer program nor a computer readable medium.

4. Claims 6-7 and 13-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

(1) Regarding claims 6-7:

Claim 6 depends on claim 5, wherein claim 5 depends on claim 2, and claim 2 depend on claim 1. Claim 1 recites applying a least square function to the residual signal; and claim 2 recites prior to the combining the minimized residual signal, filtering at least one minimized residual signal. It is clear that the least square function and the filtering are separate.

Claim 6 recites wherein the filtering comprises multiplying the residual signal by a projection matrix of a spanned signal space of the at least one carrier. The projection matrix is discloses in figure 4 where the residual signal is directly multiply by the projection matrix 306 without the least square function. It appears that claim 1 is direct to first embodiment as shown in figure 1-3; and claim 4 is the second embodiment where the least square function is include in the projection matrix. Since claims 1 and 2 clearly shows that the least square function and the filtering are separate, the two embodiment cannot work together.

(2) Regarding claims 13-14:

Claims 13 and 14 are rejected based on the same rationale as claim 6 above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1,3, 4, 8, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunton (US 7,095,798 B2) in view of Ricks et al. (US 2002/0152253 A1).

(1) Regarding claims 1, 8, 15, 17, and 18:

Hunton discloses a communication system comprising:

a transmitting apparatus configured to reduce a peak-to-mean ratio of a multi-carrier signal (the present invention provides a multi-carrier communication system employing a signal-peak suppression unit prior to D/A converter and radio frequency up converting modulator, column 10, lines 21-27);

generating a residual signal from a multi-carrier signal, the residual signal representing a difference between the multi-carrier signal and a hard-clipped multicarrier signal (figure 2 discloses a multi-carrier transmitter with a signal-peak suppression unit 110; the peak reduction calculation circuit in the correlation signal path calculates a peak reduction correction based on the input signal S and a signal peak limiting constant L, column 5, lines 52-55; a algorithm processor 140 calculates a complex correction vector C (residual signal) based on each sample of S and the signal peak limiting constant L, column 5, lines 55-65); and

applying a bank of correction filters (filter 170 in figure 3) to the residual signal (V_C in figure 3) for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (column 7, lines 31-50); and

combining the minimized residual signal and the multicarrier signal (combiner 130 in figure 3, combiner 130 combined the filtered correction signal V_F with a time-delayed version of the input complex signal stream S, column 6, lines 7-9).

Hunton fails to disclose applying a least square function to the residual signal by the correction filters.

However, Ricks et al. discloses filters with chosen weights to optimize some performance measure; for example, minimizing a cost function. As one example, when the filter weights are chosen to minimize a quadratic cost function, the filter is known as a "least squares" filter (paragraph 0011).

It is desirable to design the shaping filter by least square method because it has a fast convergence characteristic. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ricks et al. in the method of Hunton to increase the efficiency of the method.

(2) Regarding claim 3:

Hunton discloses that delaying the multicarrier signal, wherein the delayed multicarrier signal is combined with the minimized residual signal (the multicarrier signal is delayed by delay 120 in figure 3 before combined with the minimized residual signal, column 6, lines 7-9).

(3) Regarding claim 4:

Hunton discloses wherein the generating the residual signal includes clipping the multicarrier signal to a predetermined level to thereby generate the hard-clipped multicarrier signal (the output of the switch 150 represents the difference between the input signal stream S and a version of S hard limited to the amplitude L, column 5, lines 45-65).

7. Claims 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunton (US 7,085,798 B2) in view of Ricks et al. (US 2002/0152253 A1) as applied to claim 15 above, and further in view of Wright et al. (US 7,061,990 B2).

Hunton and Ricks et al. disclose all the subject matter as discussed in claim 15 that can be used in wireless communication system including cellular communication system, personal communication system, wireless local loop system and all other like system; except explicitly disclose the generating unit, applying unit and combining unit are implemented in a GSM EDGE mobile communication system.

However, Wright et al. discloses a wireless communication system including an Enhanced Data GSM system (column 1, lines 30-35).

It is desirable to implement the system in a GSM EDGE communication system because it provides higher speed data transmission. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to implement the peak power reduction system of Hunton and Ricks et al. in the GSM EDGE communication system of Wright et al. to improve the performance of the system.

8. Claims 2, 5, 9-12, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunton (US 7,095,798 B2) in view of Ricks et al. (US 2002/0152253 A1) as applied to claim 1 and 9 above, and further in view of Roux et al. (US 2003/0137949 A1).

(1) Regarding claim 2, 9, and 20:

Hunton and Ricks et al. disclose all the subject matter as discussed above but fail to disclose filtering at least one minimized residual signal.

However, Roux et al. discloses a pulse shaping filter (PSF 13 in figure 1) that shapes the clipped signal (paragraph 0032).

It is desirable to have a pulse shaping filter for the clipped signal because it can prevent the regrowth of the clipped peaks (paragraph 0013). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Roux et al. in the system and method of Hunton and Ricks et al. to improve the reliability of the system and method.

(2) Regarding claim 10:

Hunton discloses that delaying the multicarrier signal, wherein the delayed multicarrier signal is combined with the minimized residual signal (the multicarrier signal is delayed by delay 120 in figure 3 before combined with the minimized residual signal, column 6, lines 7-9).

(3) Regarding claim 11:

Hunton discloses wherein the generating the residual signal includes clipping the multicarrier signal to a predetermined level to thereby generate the hard-clipped

multicarrier signal (the output of the switch 150 represents the difference between the input signal stream S and a version of S hard limited to the amplitude L, column 5, lines 45-65).

(4) Regarding claim 5 and 12:

Roux et al. further disclose that the pulse shaping filter comprising complex filtering (the pulse shaping filter 13 is filtering a modulated signal before high power amplifier and transmission by antenna, it is inherent that the signal is a complex signal).

9. Claims 21, 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunton (US 7,095,798 B2) in view of Ricks et al. (US 2002/0152253 A1) and Langberg et al. (US 5,852,630).

(1) Regarding claims 21:

Hunton discloses a method comprising:

generating a residual signal from a multi-carrier signal, the residual signal representing a difference between the multi-carrier signal and a hard-clipped multicarrier signal (figure 2 discloses a multi-carrier transmitter with a signal-peak suppression unit 110; the peak reduction calculation circuit in the correlation signal path calculates a peak reduction correction based on the input signal S and a signal peak limiting constant L, column 5, lines 52-55; a algorithm processor 140 calculates a complex correction vector C (residual signal) based on each sample of S and the signal peak limiting constant L, column 5, lines 55-65); and

applying a bank of correction filters (filter 170 in figure 3) to the residual signal (V_C in figure 3) for at least one carrier of the multi-carrier signal, thereby generating a minimized residual signal for the at least one carrier (column 7, lines 31-50); and

combining the minimized residual signal and the multicarrier signal (combiner 130 in figure 3, combiner 130 combined the filtered correction signal V_F with a time-delayed version of the input complex signal stream S, column 6, lines 7-9).

Hunton fails to disclose (a) applying a least square function to the residual signal by the correction filters, and (b) the method is perform by a computer program embodied on a computer readable medium, the computer program controlling a process (transmitter of Hunton).

With respect to (a), Ricks et al. discloses filters with chosen weights to optimize some performance measure; for example, minimizing a cost function. As one example, when the filter weights are chosen to minimize a quadratic cost function, the filter is known as a "least squares" filter (paragraph 0011).

It is desirable to design the shaping filter by least square method because it has a fast convergence characteristic. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ricks et al. in the method of Hunton to increase the efficiency of the method.

With respect to (b), Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer-readable medium is an electronic, magnetic, optical, or other physical device or means that can be contain or

store a computer program for use by or in connection with a computer-related system or method (column 3, lines 51-65). One skilled in the art would have clearly recognized that the method of Hunton and Ricks et al. would have been implemented in a software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to have used the software in Hunton and Ricks et al. as taught by Langberg et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

(2) Regarding claim 23:

Hunton discloses that delaying the multicarrier signal, wherein the delayed multicarrier signal is combined with the minimized residual signal (the multicarrier signal is delayed by delay 120 in figure 3 before combined with the minimized residual signal, column 6, lines 7-9).

(3) Regarding claim 24:

Hunton discloses wherein the generating the residual signal includes clipping the multicarrier signal to a predetermined level to thereby generate the hard-clipped multicarrier signal (the output of the switch 150 represents the difference between the input signal stream S and a version of S hard limited to the amplitude L, column 5, lines 45-65).

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hunton (US 7,095,798 B2) in view of Ricks et al. (US 2002/0152253 A1) and Langberg et al.

(US 5,852,630) as applied to claim 21 above, and further in view of Roux et al. (US 2003/0137949 A1).

Hunton, Ricks et al. and Langberg et al. disclose all the subject matter as discussed above but fail to disclose filtering at least one minimized residual signal.

However, Roux et al. discloses a pulse shaping filter (PSF 13 in figure 1) that shapes the clipped signal (paragraph 0032).

It is desirable to have a pulse shaping filter for the clipped signal because it can prevent the regrowth of the clipped peaks (paragraph 0013). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Roux et al. in the system and method of Hunton, Ricks et al. and Langberg et al. to improve the reliability of the system and method.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Beukema (US 5,727,026) discloses a method and apparatus for peak suppression using complex scaling values.

Kim et al. (US 2003/0086507 A1) discloses a peak limiting architecture and method.

Berangi et al. (US 2005/0163248 A1) discloses a signal peak reduction circuit for non-constant envelop modulation signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/
Examiner, Art Unit 2611
8/26/2008

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611